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ABSTRACT

The consequences of using analytic methods usually associated with rational management for university decision-making related to sexual equity are examined. The research consists of two case studies concerning faculty appointments and nonteaching professional staff salaries. The concern is with how long-standing situations come to be seen as organizational problems, the use of quantitative tools to infer the presence or absence of equity in the situation, and the impact of these processes on organizational decision-making. This study is designed to add to the literature related to systematic analysis by looking at a setting and an issue characterized by a great deal of ambiguity. The first case reviews the development of a pool model to analyze sexual equity and surrounding events related to the appointment of faculty from the late sixties until 1976. The second case focuses on the use of a regression model for assessing equity in librarian salaries. It is concluded that ultimately the effectiveness of rational analysis, although associated with hard technology, is dependent on an interplay of human values and beliefs, organizational structure and norms, external influences, and unpredicted events. Short-range and long-range strategies that may improve the ability of management to promote organizational changes increasing equity in employment opportunity and rewards on the campus are listed. (SW)

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SYSTEMATIC ANALYSIS AND UNIVERSITY DECISION MAKING:

THE CASE OF SEXUAL EQUITY

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Introduction

The university is a decentralized organization where concrete goals are often diverse and conflicting, the means for attaining them are often unclear, and criteria for choosing among alternatives are often highly ambiguous (Cohen and March, 1974). The notion of equity compounds the problem of decision making as demonstrated by a philosophical and social history marked by ambiguity and conflict.

This paper focuses on the consequences of using analytic methods usually associated with rational management in an organizational context and with an issue representing a high degree of ambiguity. It reports the results of a qualitative study on the use of quantitative methods in university decision making related to sexual equity (Estler, 1978). The research consists of two case studies in a prestigious research university with emphasis on two domains of recent concern related to sexual equity in universities: faculty appointments and non-teaching professional staff salaries. The concern is with how long-standing situations come to be seen as organizational problems, the use of quantitative tools to infer the presence or absence of equity in the situation, and, the impact of these processes on organizational decision making.

The issue of sexual equity is one which has encourage universities to apply managerial methods involving quantitative analysis. Emerging as an issue at a time when universities were becoming aware of the need for rational analysis as a management tool, sexual equity tended to be presented as a problem in analytic terms (e.g. Astin, 1969; Bayer and Astin, 1975; Fidel, 1970; LaSorte, 1971; and Oltman, 1970). Further, in its contract compliance requirements the Department of Health, Education and Welfare imposed procedures requiring significant data gathering and analysis by institutions of higher education (Carnegie Council, 1975). This set of circumstances has made equity issues a major focus of the application of systematic analysis as a management tool in universities.

Perspective

Two perspectives tend to dominate the literature concerning the use of systematic analysis. The first, a rational perspective, assumes an identifiable single objective and set of preferences (Quade, 1975; Hitch, 1968). The second, a political perspective, assumes a number of objectives associated with a variety of organizational interests (Lindblom, 1968; Wildavsky, 1974). Both views assume intention precedes decision, either

as a single goal or as a set of interests. These views suggest that events related to decision making that do not reflect clear objectives of self-interest represent unexplained variance. Organizational processes inconsistent with the idea that events happen because they are intended to happen are sometimes viewed as pathological.

This study takes a third approach to the use of analysis building on the school of thought which views the university as characterized by ill-defined and inconsistent goals, an unclear understanding the the technology for achieving goals and fluid participation or, as "organized anarchies" (Cohen and March, 1974, March and Olsen, 1976). The decision making process involved in such settings is proposed as one in which streams of problems, solutions, participants and choice opportunities interact in response to the effects of timing, available energy and organizational structure.

Assuming that the organized anarchy view of the universtiy offers a reasonable approximation of reality, it raises questions about the potential impact of the application of methods which traditionally assume managerial intention and control. This problem and the apparent contradiction it implies is not adequately addressed in the literature represented by the rational or political schools of schools of thought.

While there is an extensive literature about how systematic analysis ought to be used to enable organizations to make more rational decisions, there are few studies of the actual process and effects of its use, particularly within academic institutions. This study adds to the literature related to systematic analysis by looking specifically at a setting and an issue characterized by a great deal of ambiguity. On a more practical level, it clarifies ways in which the policy analyst might more effectively inform decisions given the realities of limited information, changing circumstances, and diffusion of the power over decisions.

Finally, the study enhances our knowledge of the effects of introducing questions of equity, equality or justice into an organizational setting. Given the generation of political conflict and the pattern of linkage with other issues, equity issues tend to carry complex structural and human implications for the organization. While the literature highlights some of these concerns, it is lacking in specific scholarly attention to the impact of equity issues on organizational decision processes. This study allows us to understand more fully these effects and how a university might reasonably manage the conflict and ambiguity inherent in dealing with them.

Methods and Data Sources

The conclusions of this research are based on two case studies at a highly regarded, private, research university. The first case reviews the development of a pool model to analyze sexual equity and surrounding events related to the appointment of faculty over a span of years from initial affirmative action regulations relative to faculty women in the late sixties until 1976. The second case focuses on the use of a regression model for assessing equity in librarian salaries. Document study and interviews were used in order to understand the political context and organizational dynamics surrounding the use of each model. In particular, working drafts, final reports, internal memoranda, minutes of relevant committees, public records, and correspondence between the university and federal agencies were analyzed in relation to the more formal aspects of each case. In addition, extensive

interviews with participants provided (1) further information about circumstances documented in written materials, (2) data on beliefs about events, and (3) interpretation of organizational dynamics not necessarily reflected or fully explained in documentary evidence. Participant observation was also used as a method to gain insight related to the course of events and organizational dynamics in the salaries case.

The Cases

In the late sixties sexual equity was not generally perceived as a problem within the university in either faculty appointments or salaries. However, changing norms and beliefs regarding the role of women within society and the university; a period of social upheaval with increased attention to civil rights in general; the growth and activities of internal women's advocate groups; and external pressure in the form of government regulations all combined to cause segments of the university to redefine long-standing situations as problems.

In relation to the first case, faculty appointments, a study by a special consultant to the university president on the status of academic women was initiated in January 1971. This was several months after national attention was drawn to the issue with the delay of federal contracts at Harvard and Michigan pending satisfactory completion of reviews to assess compliance with affirmative action regulations. The study occurred a year after the establishment of a university Committee on the Education and Employment of Women (CEEW). The committee was created by the Academic Senate in response to the efforts of a number of women's groups on the campus combined into an organization called the Women's Forum. Further, the study followed a fairly extensive turnover at the top levels of the university administration which included changes in the positions of president, vice president and provost, and several deans.

The study recommended the setting of a "range of expectation" for the hiring of women faculty. The range would be based on a pool model whereby the expected proportion of women faculty in a department or school would be determined by the proportion of qualified women in the availability pool. The report further suggested that the proportion of women PhD's graduated from the university in a given year be used as the basis for the pool.

Within a year, federal regulation required a similar kind of analysis as a matter of routine reporting to HEW. The newly appointed Faculty Affirmative Action Officer became responsible for implementing the analysis on an annual basis. The case reviews subsequent modification and application of the pool model by the Faculty Affirmative Action Officer, its use within the university and organizational reaction to its use. This reaction included the setting of an alternative "proximal goal" in 1973 by the Academic Senate of 20 percent women among new hires annually, a figure based on 1972 hiring data.

The second case revolved around university efforts to assess sexual equity in professional staff salaries beginning in the spring and summer of 1971. They evolved within the previously described context from observation of some unexplained differences between men and women faculty of similar rank during the regular budget process. The imposition of the federal wage/price freeze provided an unforeseen opportunity for corrections of apparent differences by permitting salary increases only in cases of

racial or sexual inequities.

Given the unresolved status of librarians within the university; discontinuities caused by administrative turnover; and reallocation of administrative responsibilities; central review of librarian salaries was overlooked in this "accelerated salary parity project" initiated during the wage-price freeze. In the spring of 1975 the library administration committed some discretionary salary funds toward equity adjustments. The pattern resultjng from the proposed salaries still appeared questionable. Thus, they were held up at the Presidential/Provost level subject to further analysis initiated through the Affirmative Action Office. This case looks at the ensuing process involving the development and application of a regression model to the analysis of librarian salaries. The review ultimately led to retroactive corrections amounting to about $50,000 for 20 more senior librarians.

The following questions guided analysis of the cases:

1. Why did the university administration come to recognize a given situation as a problem? In each case the situations prompting analysis had apparently existed for many years before being considered problems. The process by which a situation becomes perceived as a problem is a necessary precondition to understanding the response to the problem.

2. Why was quantitative analysis chosen as a response to a given problem?

3. What were the intended and unintended effects of the decision to employ analysis?

4. What were the consequences of the application of a quantitative model and how did they effect the decision making process?

Analysis and Interpretation

It is clear in retrospect that there were differences in pay between men and women librarians of comparable rank and that there was disproportionate representation of men on the faculty relative to women, in terms of their availability, prior to the 1970's. Yet, these two situations were not identified as organizational problems requiring administrative response until early in the seventies. Transformation to problem status was not spontaneous nor would we expect it to be. For purposes of this discussion, however, we will mark the turning point in these cases as the first formal and systematic administrative acknowledgement of the potential existence of a problem. In the case of faculty appointments this point was represented by the commissioning by the university president of the 1971 Report on the Status of Academic Women and in the case of librarian salaries by the accelerated salary parity project.

1. Contextual factors. Several contextual factors might have prompted the belief that the situations represented in these cases could be considered problems. Both evolved after a major increase in national consciousness in issues related to women's rights marked by substantial increases in media coverage of women's issues from 1969 to 1970. This increase in media coverage was followed in 1971 with the issuance of

Revised Order Number 4 by the Department of Labor requiring government contractors to develop affirmative action plans with analysis and goals related to the hiring of women. The investigation by the Department of Labor and delay of contracts at Harvard in Spring 1970 suggested to universities that affirmative action regulations would indeed be enforced as they applied to women as well as minorities. Political action by women's groups at the national level made it clear that they would be watching to be sure the government enforced its regulations. Legislation in 1972 extended equal pay laws to cover, among others, professional employees in colleges and universities.

These events very likely served to bring the potential for existing problems to the attention of the university administration. Yet, they alone do not explain administrative responses that allowed for the possible existence of the problems. Administrators could have responded quite differently: They could have defined a different problem. They could have actively resisted attempts by federal authorities to regulate university practices. Such responses would not have been unusual. Indeed, many other institutions chose these alternatives. And, acknowledgement of a possible problem did not necessarily require the voluntary use of analytic studies which were part of the university's response to the problems.

The university context perhaps offers a clearer understanding of its response to these outside forces. Consideration of the university climate--its dominant norms, beliefs, values and political patterns--suggests that the apparently aggressive identification of problems may have been no less defensive than that of other universities.

First, the characterization of the University under study as a prestigious research university has important implications. It brings with it a shared value and shared stake among faculty, administrators and students in the quality of the institution. The emphasis on research places value on scientific method--in idealistic terms the systematic search for truth, in simple terms rationality. Such an institution also demands a high degree of autonomy for its members based on a respect for their expertise. It is at a basic level a professional organization. It is not likely that all individuals will act rationally simply because of the existence of value placed on scientific method. But, we would expect few people would publicly deny the value of rationality in such a climate. An approach to problem definition based on expertise and rationality would certainly appear likely in terms of the dominant norms in the organization.

A second aspect of the institutional climate was the existence of internal groups who believed in the existence of problems related to faculty appointments and salary inequities. In both cases, data suggesting problem areas was organized by groups outside the administration but internal to the institution. The formation of committees or the commissioning of a study provided options allowing the incorporation of such concerns into the consensus building process without necessarily taking specific actions.

A third element of the organizational climate--that of beliefs related to discrimination--appears critical. It seems clear that by 1969 norms legitimating lower pay for women doing similar work to higher paid men was under serious question. Further, in a general sense it appeared that "discrimination" had become a word with which few wanted to be associated. While federal regulations demanded equal opportunity, the evidence suggests

these regulations were consistent in principle with the dominant values that had evolved within the institution. While the concept of equity was a widely held value, there was not necessarily agreement on what it constituted in practice and consequently on what constituted discrimination. Nor did the dominant values assure non-discrimination on the part of individuals. But we might speculate that the belief in professionalism among colleagues would have a more dominant effect on participation than would the actions of individual deviants from the value of non-discrimination. This interpretation helps explain the apparently low level of public opposition to the results of the 1971 Report on the Status of Academic Women, the Faculty Senate Proximal Goal, the Salary Parity Project, and to the results of the Library Salary Study.

Alone, the climate of the institution does not explain all the events in these cases. We could identify other institutions with comparable values and beliefs which reacted in substantially different ways to similar events than did this university. However, the climate does provide a basic framework which might influence the probability of certain reactions to unpredictable events whose occurence is beyond the control of the institution. Further, the values and beliefs provide the basic "raw material" with which participants in various organizational dramas have to work. Participants vary across and within institutions. The beliefs and skills carried by critical participants bounded in turn by organization values may well be reflected in the way an organization reacts to certain events. Several key participants and their beliefs played a role as factors in developing the institutional climate leading to recognition of the potential existence of these problems.

The top two administrators in the university in 1971, the President, and the Vice President and Provost were most likely not screened in the selection process for their attitudes related to the quality of women in the university. Yet, both were married to women publicly identified with concerns for women's rights. While the beliefs of their wives would not require these officers to choose to take the initiative in identifying the low representation of women on the faculty or the potentially lower salaries of women as problems to which the university should commit resources in the face of a myriad of competing problems, including that of government intervention in University affairs, it would suggest that they would have a higher likelihood to acknowledge the possibility of existing problems if confronted with events drawing attention to the issues. The operative beliefs related to sexual equity of the top administrators were somewhat subject to change depending on the particular individuals in the positions. Chance brought the University individuals more likely to be sympathetic than some at other universities, which provides us with one possible explanation for why the acknowledgement of a possible problem occurred in spite of a climate of beliefs and outside pressures consistent with other universities which chose not to respond in that manner.

There was another belief shared among top level administrators in this time period unrelated to questions of equity, per se, yet nevertheless related to the question at hand. This was the belief expressed by one vice president that "we try--(and are good at) --to anticipate demands that will be made, especially by the government." This, it is believed, allows the institution to both take initiative and be in a more advantageous position to respond. By the time both issues were recognized as possible problems, it had become apparent that they would not disappear. Revised Order No. 4, federal action at Harvard and Michigan, pressure from within the university

through the Women's Forum and later the Committee on the Education and Employment of Women and the enactment of amendments to Title VII of the Civil Rights Act of 1964 and the Equal Pay Act made it clear that pressure would come to bear on several fronts related to sexual equity.

To choose to ignore the problem was likely to lead to expensive negotiations and legal action both with the federal government and individuals. Internally, given expressed concerns on the part of women combined with the professed organizational belief in equal opportunity, ignoring the problems could potentially lead to rancor and even law suits. Under these conditions exploration of the possible existence of problems would serve to offer administrators some control over events. In the event of government scrutiny, they could point to efforts to assess the problem (illustrated by references to the Report on the Status of Academic Women in the 1972 Affirmative Action Plan). In terms of internal conflict, while it was not likely to satisfy all those who felt the university was not addressing inequities, a study would most likely serve to keep basically loyal moderates in allegiance to the university rather than increasing the credibility and the viability of more radical efforts. A policy study would thus enhance the possibility of keeping the more radical opposition to a minimum.

2. Correlating Influences.

Events correlated with but not directly linked to the issues themselves also increased the likelihood that the issues would come to be recognized as problems. These included: (a) the effects of anti-war activities on campus which overloaded the university political system, leaving little room for the introduction of new issues. They also served to politicize people who had previously been uninvolved with social protest; (b) the turnover in upper level university administration which brought leadership freer to recognize new problems and to articulate beliefs related to equity issues not tied to past practices; (c) minority employment and admissions programs which set many of the precedents in terms of changing beliefs and practices related to discrimination. Thus, confrontations and compromises related to the general issue had already occurred before the issue of sexual equity had been articulated; (d) unionization efforts on campus among classified staff which had already provided incentives for the university to systematize procedures and to hire legal staff with expertise in labor law, an area encompassing many of the cases related to race and sex discrimination.

When we consider the climate of the university in terms of beliefs and, to some extent, events beyond institutional control, the question of why administrators chose to recognize issues of sexual equity as problems nearly disappears. In the context of high value placed on rationality and consensus, social upheaval, some chance patterns of individual beliefs and participation, and interest in institutional self-defense, it was most natural to choose to recognize these problems. It is not surprising that people involved in these decisions do not remember consciously making them. They appeared to "just happen." Yet they happened in a climate in which consciously or unconsciously the costs and benefits were assessed. Attorneys and administrators tried to anticipate problems. And the evidence available to them suggested failure to recognize the possible existence of potential problems in sexual equity in the early 1970's would result in a loss of initiative for the institution in dealing with a situation lawyers and colleagues were increasingly aware was inevitable. While initial efforts were in part a response to

internal interest groups and advocate reports, they occurred in a climate of external events and changing internal beliefs that made it quite reasonable to acknowledge problems. Such a climate did not exist in the late 1950's when the Faculty Women initiated a report on the status of women in the university that received little notice.

The Choice of Quantitative Analysis as an Approach to a Problem.

The literature of scientific management suggests that the rational and efficient organization would consciously employ quantitative analysis to define the dimensions of a problem and to assess the consequences of alternative solutions. A review of the properties of the organizational climate, quantitative analysis, and the issues themselves, revealed in these cases, suggest that the decision to use quantitative analysis in the university may be considerably less conscious and considerably more complex in its reasons and ultimate use than those suggested by the literature.

In the preceding discussion of the organizational climate, we noted the value placed on expertise and consensus decision, decision making processes characteristic of a professional organization. While political processes were clearly at work, demonstrated by the evolution and actions of interest groups such as the Women's Forum, the Professional Women of the University's Medical School, and the University Women's Caucus, the unwritten rules of the organization demanded that public confrontations be avoided. Thus, persuasion became a primary tool for achieving desired changes. In an environment lending credibility to rationality and expertise, quantitative analysis becomes a powerful tool of persuasion once discussion based on qualitative data fails to produce results. It is therefore no surprise that the advocate groups considered in the cases looked to data collection and analysis as steps in dealing with the university administration.

It is also not surprising for a central administration to respond to advocate efforts at analysis with further study. The reasons for such a response are implicit in the effects of the choice to use analysis. In order to understand these effects, however, a brief outline of the decision making context for both central administrators and advocates is in order.

There were a variety of offices and individuals concerned with both the issue of faculty appointments and salary equity at any given point in time. For example, by the end of 1971, besides advocate groups, there was a Committee on the Education and Employment of Women, a Special Consultant to the President on Affirmative Action for Women, a Faculty Affirmative Action Officer, a University Affirmative Action Officer, the Vice-President and Provost, various deans, and provostial staff, staff counsel and staff in Personnel and Employee Relations implementing the job classification and the accelerated parity projects all concerned with one or both of these issues. The list changed and grew in subsequent years. For those concerned with change within an ethic of decision making by consensus, it was difficult to know what standing or ad hoc channels were the most appropriate through which to negotiate. Each group and committee provided, however, an arena to discuss issues and potentially change beliefs which might lead to changing practices. It also meant that a decision could be made in one arena without

the participation or knowledge of participants in another arena.

Effects of Choice to Employ Quantitative Analysis.

To clarify why an administration would choose to employ quantitative analysis there appeared to be three sets of effects making it a feasible choice: the shaping of beliefs, managerial control, and the play and status associated with demonstrating professional expertise. These factors were not necessarily influential at every point in the process but were influences within a series with different effects in different phases.

1. Shaping Beliefs: We have seen an organization with a high value on consensual decision making, a low value on open conflict and a wide variety of somewhat loosely connected arenas for the discussion of issues. It is an organization where credibility is somewhat controlled by professional acceptance. In order to catalyze a change in practices, e.g. in salary scales and faculty hiring patterns, agreement must be reached among a group of decision makers and potential dissidents that a problem exists and that a given change in practice is the appropriate solution. This may require a change in beliefs among those involved with the decision, those who would implement the decision, and actual or potential dissidents.

When there is skepticism, analysis becomes a powerful tool for shaping beliefs, not only in the data analyzed but in the modeling process. In the library salaries' case, there was a strong belief among a number of participants that "We don't discriminate." However, in the face of data produced by a model which they had helped define, thus lending it credibility, the issue changed to the appropriate resolution of an apparent problem. In relation to faculty appointments, however, relatively few participants had been involved in the model development. When the results appeared inconsistent with beliefs, i.e. that "we are appointing too few women and minorities," they had limited credibility.

The credibility of results is bounded by the beliefs of participants and their tendency to see reinforcement for what they wish to believe in their experiences. Given the faith in rationality and expertise in the organization, quantitative analysis permits the extension of those boundaries, depending on the degree to which the model itself has credibility as an accurate, logical representation of reality. The desire to satisfy the belief in rationality can in effect overcome some of the inconsistencies results may have with other beliefs.

2. Managerial Control: The employment of systematic analysis provides a means of shaping beliefs for both advocates and decision makers (distinctions that are not mutually exclusive). However, it is a game in which management frequently has the advantage based primarily on access to data. In most cases, the decision on the part of management to employ quantitative analysis is one that immediately provides some control over processes unmanageable by fiat (given the number of arenas for discussion). In turn, it provides longer term control. The use of analysis serves as means of managerial control in the following ways: (a) by virtue of access to data and expertise it provides a means of gaining institutional initiative over a problem definition process most likely begun by advocates. (b) By

taking an opportunity to create a new arena for discussion by initiating an analytic study, an administration can introduce "nonbelievers" to new information and participants allowing beliefs to be changed. In short, it is an arena where consensus-building can occur. Consensus-building is further enhanced by the occasion provided by the modeling process for cutting across existing structures to draw together those participants relevant to a given decision. (c) In appearing precise and rational while representing only an approximation of reality, a model provides means for some administrative control of ambiguity. We might, for example, consider the conflicting managerial interests inherent at the base of both the cases of salary equity and faculty appointments. On one hand, there is the interest of appearing "successful" in achieving equity to the federal government and partisan groups. And, on the other hand, there is an interest in encouraging those in decision making roles to "do better."

--Thus, the Faculty Affirmative Action Officer was able to emphasize the precision and appearance of success in public and to government agencies while emphasizing the conservative nature of the approximation in private to deans and department chairmen. (d) Another managerial control implicit in the use of systematic analysis is that of access to and dissemination of information. Analysis requires the compilation of data. Once compiled they are available not only for the question at hand but for additional questions. In an information-poor environment, the data becomes a powerful tool. The ability to control dissemination of data, in turn, effects perceptions of the problem. (e) A final and perhaps the most important effect of analysis is to provide control over the definition of the problem inplicit in translating a complex set of circumstances to a more simplified model of the world.

We might note that the ongoing managerial cost of analysis in a given situation decreases after the initial analysis. This results from the high "start-up" costs associated with the initial gathering and transformation of data and model development. Thus, over time, we might expect a managerial response involving quantitative analysis in a given area to occur with much lower levels of need for control. Indeed, it is not surprising to find analyses routinized following initial use.

3. Demonstration of Professional Expertise: Status and Play: There is an additional set of effects which might explain why quantitative analysis might be employed in a given situation. They are less obvious in the literature, less likely to be conscious reasons on the part of participants, and probably of lesser influence. They involve the property of quantitative analysis as a professional activity associated with expertise, autonomy and self-regulation. Specifically, they involve the rewards accruing to the professional in an environment placing high value on professional expertise.

Though it might be primarily characterized as a professional organization, the university is staffed by a bureaucracy to carry on day to day operating functions. Some of those employed within the administrative structure are specialists with strong professional ties such as lawyers, accountants and library administrators. Others are generalists responsible for a wide variety of tasks who have professional ties through affiliation with an academic

discipline and professorial appointments such as the President and the Vice-President and Provost. In addition, there are those generalists without specific professional affiliation, exemplified in these cases by the moving administrative forces behind the Librarian Compensation Study.

For those without professional affiliation, conduct on their jobs in such a way as to demonstrate specific expertise and autonomy may provide a means for gaining credibility and status in a setting marked by professional norms. Sponsorship and use of quantitative studies with their trappings of professionalism is one way of demonstrating expertise. It is unlikely that aspirations to professional status would be sufficient cause, in the face of a wide variety of demands on time, to choose to sponsor a quantitative study. Yet, the incentive of increased status and credibility is likely to make such a choice attractive given an issue of sufficient importance to require a fair amount of attention.

A final element linked with professionalism which might increase the likelihood of a choice of quantitative analysis is simply the pleasure of the process--or play. We tend to associate intellectual challenge and exchange with the professional life of the academic. Model building, particularly in a collaborative setting, provides opportunity for such exchange regardless of the specific issue involved. The process of solving it is pleasurable in providing intellectual challenge and even an escape from day to day details.

Conclusions and Implications.

We can consider the overall picture presented by these cases in two ways: one in terms of the effect of the analysis process, and the second in terms of the nature of change in the university produced by that process. Regarding the effects of the process, we might look at quantitative analysis not as a rational decision making tool but like the legal system as a flexible yet bounded framework for debate and change. As the legal system provides a structure of rules about which there is consensus, within the university the process of rational analysis provides a set of rules about which there is acceptance among participants despite disagreement over specific issues treated within those rules.

Laws are established out of a complex political process reflecting societal values. They are enacted to respond to perceived problems, as does a quantitative model within the university. And, as a law is but the beginning of a long interpretation process through the court system, so the use of a quantitative model is the beginning of an interpretation process through a dynamic organizational structure. Both the court system and the development of a model provide an agreed upon framework for the airing and management of conflict. As illustrated by the historic Brown vs. the Board of Education ruling on school desegregation, the legal system, like a model, does not provide truth. But the process surrounding the use and interpretation of both laws and models provides a framework for the integration of constantly evolving societal values, political processes and everyday practices.

The analogy with the legal system brings us, too, to the nature of change produced by the modeling process within a university. Perhaps the

greatest criticism and the greatest strength of the legal system as an instrument of social change is its slow and seemingly ponderous nature. Extreme views enter a process relying upon shared acceptance of procedures. Immediate changes may seem either too great or too small and may satisfy few. The process, however, over time moderates the extent of change. In the long run, participants enter and leave, become educated to the complexity of the issues, and they become somewhat coopted from both extremes to more moderate positions. Change becomes far more incremental than dramatic. Without agreement among adversaries on the process, the system would fail with a resulting failure of the conflict management process it provides.

Advocates for radical change are not naive in refusing to play by the rules of the legal system. It is not likely to produce radical societal change given its moderating processes. Yet, precisely because it provides a forum flexible enough to win the agreement of the majority of participants that the rules for the process are appropriate, it reduces the attractiveness of radical methods and produces change reflecting mainstream societal norms. In short, it provides a way to consider those ideas produced at either extreme of the political spectrum without suffering disruption to the entire system.

So also does the use of quantitative analysis within the university provide a means for incremental change based on the participation of those holding a variety of views. Perhaps the ultimate effect of its use related to problems of equity is to provide an arena for the resolution of conflict within the university. While there are always situation which may not be resolved through the analysis process, and while we have no comparative data against which to test, we might speculate that the arena provided by the analysis process may reduce the need for appeal to outside agencies to resolve internal problems of equity.

Prescriptive Implications.

The view of quantitative analysis presented in this study has some specific implications for management that may differ from those implicit in the view of analysis as a rational tool. It is clear that the results of the analysis process suggest some specific strategies which may enhance the ability of management to promote organizational changes increasing equity in employment opportunity and rewards among groups on the university campus.

It appears that the modeling process provides an arena for discussion and changing beliefs, a means for discovering and clarifying administrative goals, a means for gaining control over the management of conflict and information, a visible symbol that a problem is being addressed in a manner consistent with organizational values, and a means for implementing changes to correct situations which are identified as inequitable to some segment of the university community. The following strategies would serve to maximize the benefits of the process toward decisions which would reduce apparent problems while preserving institutional autonomy. Assuming that problems of varying levels and significant depth are not eliminated with a single effort, these strategies are concerned with both initial efforts at change, and with the means for sustaining those efforts and their effects.

Short-term Strategies:

1) Respond early to advocate efforts with managerial analysis. This provides a means to assess whether the situation is indeed a problem. And it moves the natural history more quickly to institutional control and possible implementation of corrections.

2) Include advocates in the modeling process. This preserves the benefits of the advocate stage of the process, serves as a mechanism for discussion and education for both administrators and advocates, and maintains the credibility of the process and the model.

3) Include those responsible for implementation in the modeling process. It is clear that the changing of beliefs which occurs in the modeling process and not simply the quantitative results of the analysis is perhaps the most critical factor in ultimate change in practices. Regardless of policy dictates, bureaucracies can be notoriously inactive in implementing changes believed by their members to be unimportant or unreasonable. The modeling process provides a mechanism for establishing the reasonableness of change. If those who would implement change are uninvolved, it is likely that existing organizational procedures will continue with little attention to change based on the results of analysis.

4) Avoid the danger of substituting symbolic attention to the problem for substantive attention. Numbers must be followed up with sustained attention to implementation. This involves awareness of the cycles of regular organizational processes and presentation of results at times and in arenas critical to implementation such as in the budget and hiring processes. While the analysis process itself provides a means for bypassing the regular organizational structure allowing it to be a catalyst for action on an issue, it is through everyday organizational processes that implementation usually occurs.

Long-term Strategies:

There are long range effects of the analysis process, particularly as it becomes a part of routine organizational channels that serve to limit or slow movement toward change. There are strategies which can minimize these effects:

1) Institutionalize the process and not merely the model. This and other studies suggest that an imposed model is likely to have less than optimal effects on organizational practices. Routinization becomes necessary for reasons of cost and integration of the solution within the organizational processes involved with sustained implementation. However, recognition of the effects of the process in building credibility for the model and the implications of its results speaks to the benefits of a routine process rather than a routine mechanical audit.

2) Ask new questions. Given the apparently irreversible nature of a process that at once promotes change in the short run but reduces expectations in the long run, new questions for analysis related to the issue reinitiates the process. This can help reduce the sense that "this is a problem already dealt with." New questions can extend the analysis process for a longer period of time, bring in new participants, and strengthen the belief-building process, both in terms of participant numbers and the extent of belief change.

3) Assign a specific individual to work with the analysis process on a sustained basis. It serves to provide ongoing attention to the task so it does not get lost in the face of competing problems. It allows increasing knowledge and sophistication to be carried on in the midst of changing participants.

4) Have a vision rather than a plan. While it is clear that many unpredictable factors enter into the management of equity, this does not necessarily make it unmanageable. It may however demand a different kind of managerial style than that implied by more strictly rational approaches to managerial decision making. A plan suggests a step-by-step program for reaching a specific goal. Such a program can be easily stymied by unexpected events and influences. A vision, in contrast, might be compared to the first rough pencil sketch upon which a painting will be based. It provides a general idea of where the artist is going but allows for opportunity and chance in discovering combinations of color, new insights, adaptation to available working materials, the reactions of others, and modifications in the design as the painting unfolds.

So too, a vision in the mind of a manager or advocate allows for opportunity in using unexpected events, unanticipated outcomes, newly discovered goals, new information and the insights of multiple participants in filling the tapestry of organizations events, procedures and people making up the decision making process to meet that vision.

These strategies are, like the analysis process itself, not heroic. Yet they address the fact that most managers, much of the time, may have only limited information and no clear goals or intentions regarding equity issues. These strategies provide a means for managers to discover and implement goals related to equity in the university. They provide approaches that may lead to change while reducing the potential for conflict. They can do so with respect for both the prerogatives and responsibilities on managers and the realities of everyday organizational processes. To ignore either of these elements generally leads neither to change nor reduced conflict.

This study has suggested that quantitative analysis usually associated with rational decision making is, as a process, only partially rational. As an organization the university is not a closed system in which relevant information, all possible solutions, and all potential influences are under the control of managers. Indeed, one could imagine costs affecting the basic nature of the institution if this were the case. Issues of equity and the values implicit in the purposes of the university and the resulting organizational structure introduce further ambiguity to a process which traditionally assumes knowable consequences and clear goals. It is clear that while quantitative analysis introduces the aura of rationality into an environment placing value on both expertise and the exercise of scientific method, its application is only one element in a complex of human concerns involving loyalty to the institution, the desire to "do the right thing", professional and personal pride, simple pleasure of the process, and sometimes passionate commitment to values. Ultimately, the effectiveness of rational analysis, although associated with hard technology, is dependent on an interplay of human values and beliefs, organizational structure and norms, external influences, unpredicted events and the unanticipated consequences of predicted events.

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